ABU OWOICHO-OCHE ONEH IE/ENG04/001 ENG281 ASSIGNMENT 2

At point of Intersection, $5x^2 + y^2 = 5$ — ① $\Rightarrow 5x^2 + y^2 - 5 = 0$

$x^2 + y^2 = 4$ — ② $\Rightarrow x^2 + y^2 - 4 = 0$

$5x^2 + y^2 - 5 = x^2 + y^2 - 4$

$5x^2 - x^2 = 5 - 4$

$x^2 = \frac{1}{4} = x = \sqrt{1/4} = \pm 0.5$

When $x = \pm 0.5$ from ②

$x^2 + y^2 = 4 \Rightarrow y^2 = 4 - x^2 \therefore y = \sqrt{4 - x^2} = y = \sqrt{4 - (0.5)^2}$

$= \sqrt{3.75} = 1.94$ //

$\therefore$ Coordinates of point of intersection $= (0.5, 1.94)$ or $(0.5, 1.94)$

Recall $\tan\theta = \frac{dy}{dx}$

from ①, $10x + 2y\frac{dy}{dx} = 0 \Rightarrow \frac{dy}{dx} = \frac{-10x}{2y} = -\frac{5x}{y}$

$\therefore \tan\theta_1 = \frac{-5(0.5)}{1.94}$ or $\frac{-5(-0.5)}{1.94}$

$= -1.2887$ or 1.2887

$\therefore \theta_1 = \tan^{-1}(-1.2887)$ or $\tan^{-1}(1.2887)$

$= -52.19°$ or $52.19°$

from ②, $2x + 2y\frac{dy}{dx} = 0 \Rightarrow \frac{dy}{dx} = \frac{-2x}{2y} \therefore \frac{dy}{dx} = \frac{-x}{y}$

$\therefore \tan\theta_2 = \frac{-0.5}{1.94}$ or $\frac{-(-0.5)}{1.94}$

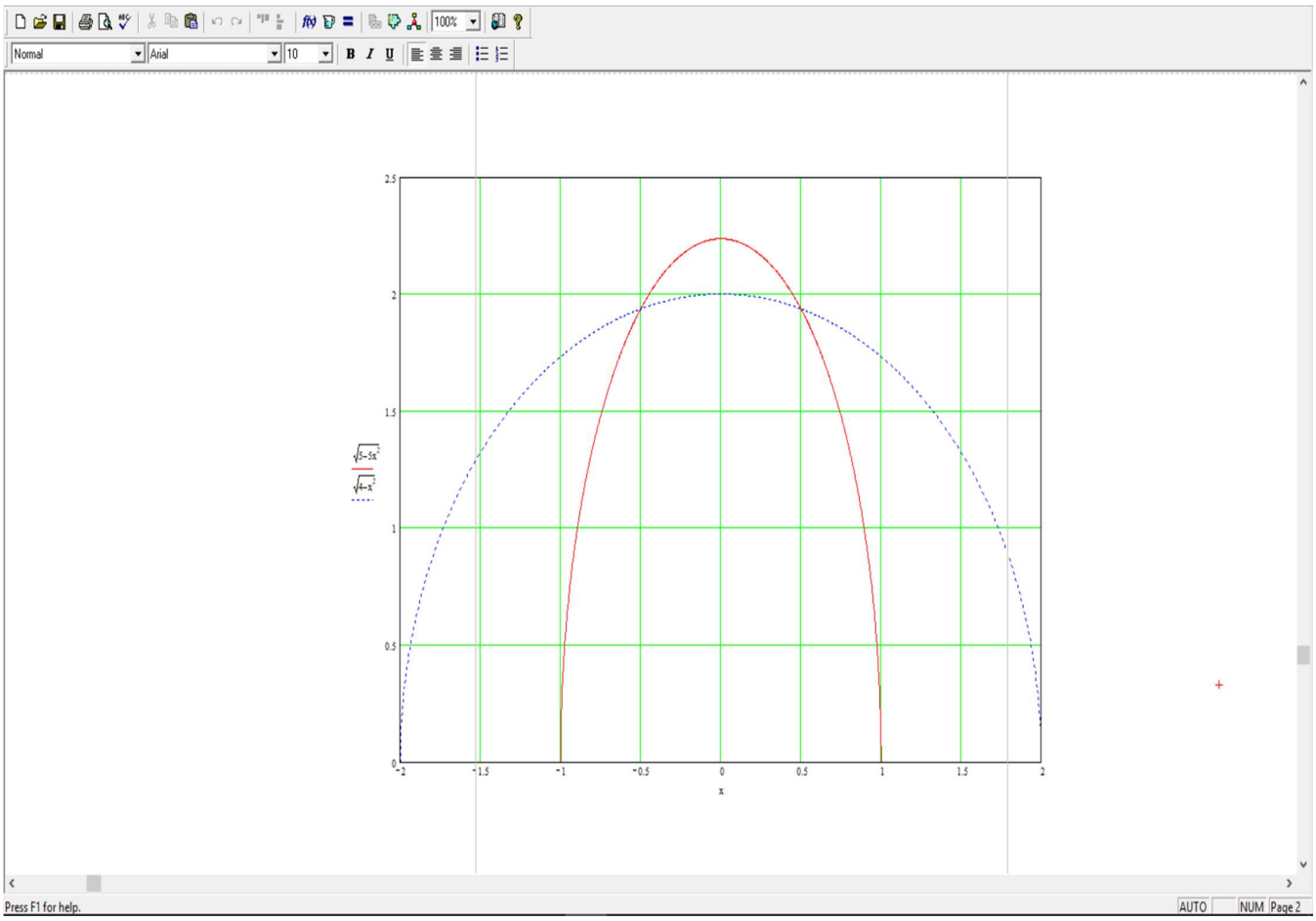
$= -0.2577$ or 0.2577

$\theta_2 = \tan^{-1}(-0.2577)$ or $\tan^{-1}(0.2577)$

$= -14.45°$ or $14.45°$

$\theta = \theta_2 - \theta_1 = -14.45 - (-52.19)$ or $14.45 - 52.19$

$= 37.74°$ // or $-37.74°$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Page 2